ACCUMULATOR APPARATUS FOR LUMBER SORTERS

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ABSTRACT
An accumulator for an automatic lumber sorter which includes a bucket supported by a hydraulic piston cylinder assembly for movement between an elevated lumber receiving position and a lower discharging position. The bucket bottom is closed by a pair of swinging doors which are hydraulically moved between open and close position. A gravity close latchin device which normally releaseably locks the doors in a closed position when the bucket is in the elevated position is automatically released when the bucket is lowered to enable the doors to be opened.

5 Claims, 3 Drawing Figures
ACCUMULATOR APPARATUS FOR LUMBER SORTERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to automatic lumber sorters and in particular to accumulators for accumulating, sorted pieces of lumber to form a load which is then transported by conveyor for stacking.

2. Prior Art

Automatic lumber sorters in lumber mills, conventionally, have an endless upper conveyor on which unsorted lumber is conveyed over successive lumber sorting stations. The sorters include means for selectively dislodging lumber pieces of predetermined cross-section at selected stations. The dislodged lumber at each station is permitted to accumulate to form a load of a predetermined number of pieces and the load is then deposited on a lower conveyor which carries each load away for stacking.

In some sorters accumulators such as tilting platforms are used to accumulate a load. When sufficient number of pieces of lumber has accumulated the platform is then tilted to allow the load to drop on to the lower conveyor for removal to a stacker. Use of accumulators of this type, due to the distance of lumber drops, usually results in excessive lumber breakage.

SUMMARY OF THE INVENTION

The present invention provides an accumulator apparatus at each station of a lumber sorter which handles lumber loads gently and thus markedly reduces breakage.

The accumulator apparatus of the present invention includes a bucket open at its top and closed at its bottom by a pair of swinging doors which are hydraulically operated between closed and opened positions. The doors are releasable either in the closed position or fully open by the use of a gravity closed latch assembly. Hydraulic means support the bucket for movement between an elevated lumber receiving position and a lowered lumber discharging position. A latch operator is positioned in the path of the latching assembly for operating the latter to a release position as the bucket is lowered to the discharging position so as to enable the hydraulically operated doors to be swung to the open position for discharging the load.

A detailed description following, related to drawings, gives exemplification of apparatus according to the invention which, however, is capable of expression in means other than those particularly described and illustrated.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a portion of a lumber sorter showing two adjacent sorting stations and accumulator apparatus of the invention at each station.

FIG. 2 is an end view of the accumulator apparatus of the invention.

FIG. 3 is a sectional side view of a portion of one end of the accumulator apparatus on line 3-3 of FIG. 2.

DETAILED DESCRIPTION

FIG. 1

FIG. 1 shows a portion of a typical lumber sorter of the type used in lumber mills at a pair of adjacent sorting stations 11 and 12. The lumber sorter has a frame structure 13 which supports an upper main conveyor 14 which passes over the stations 11 and 12 and which transports pieces of lumber of random cross-sectional size from a planer or the like.

The main conveyor is, typically, a plurality of parallel endless chains, one only being shown, which are driven at the same speed by known means. The chains carry chairs 16 on to which individual pieces of lumber of random cross-sectional dimension are fed by known means to be carried over the sorting stations.

The sorter includes conventional sensing and operating mechanism, not shown, which automatically dislodges individual lumber pieces from the chair in accordance with predetermined cross-sectional dimension standards adopted for each station.

A conveyor 17 which, like the main conveyor 14 has a plurality of parallel endless chains is located beneath the main conveyor for carrying lumber discharged from the main conveyor to a conventional stacker apparatus, not shown. The conveyor 17 is usually spaced below the main conveyor 14, about 20 feet.

The sorter 10 includes, at each station, lumber accumulating apparatus 18 and 19 for accumulating the lumber dropped from the main conveyor at each station until a load of a predetermined number of pieces is obtained and then for discharging the load on to the lower conveyor 17, whence the load is conveyed to the stacker.

FIGS. 2 and 3

FIGS. 2 and 3 show one end of the accumulator 18. The accumulator has a bucket 20 having end walls one of which 21 is shown and inwardly inclined side walls 23 and 24. Parallel doors 25 and 26 are hingedly mounted at the lower side edges of the side walls for swinging movement between a closed position, as shown in solid outline in FIG. 2, and an open position, as shown in broken outline. The doors are moved between the closed and open positions by operation of hydraulic piston and cylinder assemblies 27 and 28 which are connected at lower ends to brackets 29 and 31 mounted on the doors and connected at opposite ends to pins 32 and 33 projecting from the end wall 21. The other end of the bucket is similarly provided with piston and cylinder assemblies corresponding to the assemblies 27 and 28.

A piston and cylinder assembly 36 is pivotally connected at one end to a pin 38 projecting from the end wall 21 above the center of gravity of the bucket and is pivotally secured at its opposite end 39 to an upper frame work member 41. A piston and cylinder assembly, not shown, similar to the assembly 36, is connected between the opposite end wall of the bucket and the framework.

The doors 25 and 26 are normally releasably maintained in their closed position by a latch assembly 42 mounted on the end wall 21, and a similar latch assembly, not shown, mounted on the opposite end wall of the bucket. The latch assembly 42 includes a pair of latch bars 43 and 44 mounted on the doors which, when the doors are in the closed position are engaged by latching hooks 45 and 46 mounted on a pin 47 which is rotatably mounted between brackets 48 and 49 mounted on the end wall 21 of the bucket. A laterally extending weighing handle 49 mounted centrally on the pin 47 normally urges the hooks to a latching position, as shown in solid outline in FIG. 3. The hooks are auto-
matically moved to a disengaged position, seen in broken outline Fig. 3 by engagement of the latching arm, with an upper end 52 of the vertical bar 53 secured to framing members 54. Engagement of the handle with the bar is effected when the bucket is lowered by the elevating cylinder assemblies 36 towards the discharge position shown in broken outline in Fig. 3.

All piston and cylinder assemblies are connected, through suitable conduits, not shown, to a suitable source of pressure through control valves, not shown, operation being automatically controlled by conventional sensing and operating devices common to lumber sorters.

OPERATION

During operation of the lumber sorter the buckets at each station are normally in the elevated lumber receiving position with the doors closed and latched. Each bucket remains in this elevated position until it receives a full load of sorted lumber. The sensing and operating device then effects actuation of the elevating piston cylinder assemblies to lower the fully loaded bucket to the lowered discharging position. As the loaded bucket is lowered towards the discharge position engagement of the latching handles with the upper end of the bar moves the latch hooks and maintains the latter in the disengaged position so as to enable the doors to be opened through actuation of the cylinder piston assemblies 27 and 28. The elevating piston cylinder assemblies then automatically retract to lift the lowered bucket and deposit the full load of assorted lumber on the lower chain. The piston cylinder assemblies 27 and 28 are automatically retracted to close the doors and the latch loaders automatically swing into latching engagement the latch bars when the handle clears the bar 53.

It is seen that the accumulating assembly in accordance with the invention enables gentle handling of the lumber so as to minimize breakage.

Further, although hydraulic means have been specified to lift and lower the bucket and to open and close the doors, it is to be understood that pneumatic or mechanical means can be used. These further means have not been described as it is considered that their use and assembly is well within the ken of a competent mechanic.

1 claim:

1. In an automatic lumber sorter having a frame supporting an endless upper conveyor for carrying unsorted pieces of lumber over successive sorting stations, means for selectively dislodging lumber of predetermined dimension at selected stations and a conveyor extending below the stations for receiving lumber dislodged; a lumber accumulator at each station, each accumulator including:
   a. a bucket having side and end walls and open at its top,
   b. doors hinged at lower edges of the side walls swingable between open and closed positions,
   c. means supporting the bucket for vertical movement between lumber receiving position adjacent the upper conveyor and a lumber discharge position adjacent the lower conveyor,
   d. door operating means connecting the doors and end walls of the bucket operable for moving the doors between closed and open positions,
   e. a gravity operated latch assembly at each end of the bucket for releasably locking the doors in the closed position,
   f. a latch operator adjacent the bucket for engaging and maintaining the latch assembly in an unlatched position when the bucket is lowered towards the discharge position so as to enable the door operating means to be operated to open the doors.

2. An automatic lumber sorter as claimed in claim 1 in which the means for supporting the bucket for vertical movement includes a hydraulic cylinder piston assembly at each end of the bucket, each assembly being connected at one end to an end wall of the bucket and at an upper end to the frame.

3. An automatic lumber sorter as claimed in claim 1 in which the door operating means includes hydraulic piston and cylinder assemblies.

4. An automatic lumber sorter as claimed in claim 1 in which the locking assembly includes a pair of latch hooks swingably mounted at each end of the bucket, a latch bar on each door adapted to be engaged by the hooks when the doors are closed and a massive handle operatively connected to the hooks normally swinging hooks to latching engagement with the latching bars when the doors are closed.

5. An automatic lumber sorter as claimed in claim 3 in which the latch operator includes an upright bar in the path of each of the handles, each upright bar having an upper end disposed so as to engage the handle of each latching assembly and swing the hooks to an unlatching position when the bucket is lowered.